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Statistical Characterizasions of Current and Wave Patterns on the Southern California Shelf off Palos Verdes for use in Sediment-Transport Models (abstract from poster): EOS Trans. AGU, 76(3), Ocean Sciences Meeting Supplement OS1, 1996.

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In 1992, a multi-disciplinary project was initiated to investigate and understand the processes that resuspend and transport sediment on the Palos Verdes shelf. One goal was to collect environmental data that could be used by numerical models to predict the resuspension and movement of the actual shelf material. Hence, an extensive field program was developed to collect current, surface wave, wind stress and sea level data for an entire year. Instruments were deployed simultaneously along and across the shelf to characterize the spatial and temporal structures of the environmental parameters. Both tidal and subtidal currents flowed primarily along, rather than across the shelf, with similar amplitudes at common depths below the surface. In particular, near-bed alongshore currents had similar amplitudes and common temporal patterns. Hence, it was possible to use a modified modal analysis to create a single record to represent the regional flow pattern for sediment-transport models. This synthetheic record accounted for over 70% of the variability in near-bed alongshore currents and had none of the data gaps found in individual current records. The temporal portion of the mode was scaled to have a mean and standard deviation similar to the measured current field. A synthetic record to statistically characterize near-bed, cross-shore currents was created using a scaled-average, rather than modified-modal, analysis because cross-shelf currents had similar amplitudes but no common temporal structure. Wind-driven currents were weak, usually less than 5 cm/s, and accounted for less than 15% of the variability in the subtidal current field. The presence or absence of surface waves, which are a combination of local, wind-driven waves and non-local swell, was not related to the amplitude of the near-bed currents. Forty-five percent of the larger wave velocities were associated with current speeds less than 10 cm/s; only 3% with current speeds greater then than 25 cm/s. This lack of correlation between currents and wind, or currents and waves, suggest that these fields can be input independently into erosion models for the Palos Verdes shelf.

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